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CENTRAL FAX CENTER Case No.: 2056B

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Dollars

Serial Number: 10/696,757

Filed: October 29, 2003

For: INFLATABLE AIRBAG AND METHOD OF MAKING THE SAME

Group Art Unit: 3616

Examiner:

Commissioner for Patents  
PO Box 1450  
Alexandria VA 22313-1450

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Date: October 31, 2007

Signature: Linda-Ann Manley

Name: Linda-Ann Manley

DECLARATION OF INVENTOR  
JOHN A. SOLLARS, JR.

1. I, John A Sollars, Jr. of 805 Wheelis Way, LaGrange , GA 30240 make this statement from my own personal knowledge. I am inventor of the invention set forth in the above referenced patent application.

2. My educational background is that I received a Bachelors degree in Biology / Chemistry from the University of Alabama in 1974. Further, I have achieved the status of being duly elected by my peers in the Airbag Industry, and currently serving as Chairman of ASTM (American Society for Testing and Materials) sub-committee D13.20 for Inflatable Restraints (airbags).

3. I am employed as a Research Engineer in the Automotive Airbag Research Group for Milliken & Company ("Milliken) in La Grange, Georgia. I have personal knowledge of the facts stated in this Declaration.

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4. I am very familiar with my invention. The invention, in one embodiment, includes an airbag cushion structure of interconnected woven in joints that resist gas permeation, the structure having between the first and second interconnected joints with 2-4 yarns in the first layer and 2-4 yarns in the second layer. Thus, in the invention, woven in joints are provided with a total of between 4 and 8 yarns per two-layer structure between joints, i.e. counting both the top and bottom layers between interconnected joints. One such embodiment of the invention is illustrated in my patent application in Figures 5-6. The use of closely spaced joints is useful in forming flow barrier elements in the airbag cushion, as described on page 15 of the patent application specification. Such a structure resists gas leakage, and retains gas pressure for longer periods of time.

5. Further, I have reviewed Japanese Utility Model 50 [1975] - 145875 to Katsutoshi Ando et al. (hereafter "the Japanese 875 patent"). I have seen Figure 2 of that patent disclosure, in which an airbag is shown with a weave that includes twelve total (12) yarns, the structure having six (6) yarns in each layer of a two layer structure, between interconnected joints, for a total of 12 yarns.

6. Upon learning of the rejection of my patent application based upon the Japanese 875 patent, I did some testing of the seams of the invention, as compared to seams as shown and disclosed in the Japanese 875 patent. I made special airbags using the so-called "cross-over" seam of my invention, having interconnected joints as described and claimed in my patent application. Airbags were made with 4 total yarns (2 per side) between interconnected joints as a representative example of the invention. Furthermore, other comparative airbags were made in the same manner, but with 12 total yarns (6 per side) between interconnected joints to represent the Japanese 875 patent embodiments. Two iterations of bag shapes and sizes were produced. One bag is relatively small and is a size and shape useful for development work in a laboratory scale, but with features typical to curtain bags. The other bag shape chosen is a full size curtain bag as currently being sold into the market for installation into a vehicle.

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These samples were produced alternating and adjacent within the same piece of fabric to ensure that both the seam variations of the invention and the Japanese 875 teachings were produced and processed under essentially identical conditions. Two bags each, of each bag shape iteration, and of each seam type were leak tested. The pressure readings on the Y-axis of the graphs of Figure 1-2 represent the pressure experienced in the airbag over time, after pressure is applied to the airbag seam. See results in Figure 1. The full size airbag was also tested at a higher, more rigorous pressure, as shown in Figure 2.

7. In all instances, the airbags having seams with 12 yarns between interconnected joints leaked down to a lower pressure rate at a significantly faster rate as compared to the leak down rate of the seams of airbags that employed the invention, i.e. represented by use of 4 yarns between interconnected joints. It is more desirable, and the bag of greater value in the market, for the bag to retain air pressure as long as possible. A seam type that will retain pressure longer will allow the use of less coating material to achieve the required and specified leak down requirement. This savings of material translates in to product cost savings and economic advantage. These tests results are unexpected, as further described below.

8. This advantage of the invention shows even a higher relative difference at the typical 5-6 second time interval required in the industry, i.e. the seams of the invention compared to the seams shown in the Japanese 875 teachings. For example, the data showed when tested at 10.15 psi airbag pressure, at 5 seconds of elapsed time, for a full size bag, a 12 yarn wide seam showed 6.24 psi. At 5 seconds of time for the 4 yarn seam (invention), the pressure value of 7.61 was recorded. This is an increase in performance for the 4 yarn seam/airbag of the invention of about 22% improvement compared to the Japanese 875 sample.

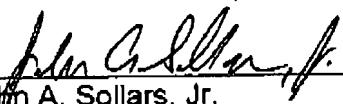
9. The higher and more rigorous starting pressure, as shown in Figure 2, of 14.5 psi, causes even greater shifting of the yarns in the undesirable Japanese 875 sample,

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with undesirable gas leakage through the seam of the Japanese sample. Further, at the 14.5 psi starting pressure, at 5 seconds, the percent improvement was about 34% when comparing the 4 Yam seam of the invention to the 12 Yam seam of the Japanese 875 embodiment. Again, these are significant and unexpected results in the difference in the ability of these two samples to retain applied gas pressure when used in an airbag. The results are due to the discovery of this new seaming arrangement.

10. All statements set forth herein are made of my own knowledge and are true, and all statements made on information and belief are believed to be true. I make these statements with the knowledge that willful false statements are punishable by fine or imprisonment, or both, and may jeopardize the validity of the application or any patent issuing thereon.

  
John A. Sollars, Jr.  
October 30, 2007  
Date